IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Kazuhiko KOBAYASHI et al.

Serial No.: 09/384,380 Group Art Unit: 1713

Filed: August 27, 1999 Examiner: Rip A. Lee

For: FIRE-RETARDANT RESIN COMPOSITION AND MOLDED PART USING THE SAME

DECLARATION UNDER 37 C.F.R. § 1.132

Honorable Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

I, Kazuhiko KOBAYASHI, declare and state that:

1. I am a Japanese citizen residing at 3-26-7, Sugita, Isogo-ku, Yokohama-shi, Kanagawa-ken, Japan.

I was graduated from Science & Engineering Section, CHUO University in March 1982.

I have been employed by RIKEN VINYL INDUSTRY CO., LTD. since April 1982. I engaged in research and development of insulating-materials for electric wires at Compound technical department of the said company since April 1985. Further, I have been engaged in research and development of insulating-materials for electric wires in Polymer Application R&D Department at Material Research Center of the said company since April 1998.

I am one of the inventors of the subject matter of United States Patent Application Serial No. 09/384,380, filed on August

27, 1999, and am thus intimately familiar with the contents of the application, its prosecution before the United States Patent & Trademark Office, and the references cited therein.

2. I have studied the content of the cited Tasaka et al.'s U.S. Patent No. 5,929,165, Aida et al.'s U.S. Patent No. 5,221,781, and Nosu et al.'s U.S. Patent No. 6,218,454.

3. To show the superiority of the present invention, the following tests were conducted, by me or under my supervision:

Test

A resin composition, Comparative example A, was prepared in the same manner as in Example 1 in the present specification, except that the ethylene/α-olefin copolymer was changed to another ethylene/α-olefin copolymer. That is, Excellen VL 200 (trade name, manufactured by Sumitomo Chemical Co., Ltd.), which was a very low-density straight-chain polyethylene synthesized in the presence of a multi site catalyst (MFR, 2.0 g/10 min; Density, 0.90 g/cm^3), was used in place of the ethylene/α-olefin copolymer (c-1) synthesized in the presence of a single site catalyst.

From the thus-obtained resin composition, a 1-mm sheet and an electric wire, corresponding to Comparative example A, were obtained in the same manner as described in the EXAMPLES section (lines 11 to 22 on page 55) of the present specification.

As to the thus-obtained sheet, the tensile properties (extension (elongation) (%) and tensile strength (MPa)) and the heat deformation property were evaluated in the same manner as

described in the EXAMPLES section (lines 19 to 24 on page 56) of the present specification. The results are also shown in Table I below.

Further, regarding the covering layer of the thus-obtained insulated wire, the tensile properties, the abrasion resistance, the horizontal flame test, the 60°-inclined flame test, the heat deformation rate test, the whitening test (whether a whitening phenomenon was observed when bent), the extrudability test, and the flexibility test were carried out, in the same manner as described in the EXAMPLES section (from line 12 on page 57 to line 3 on page 61) of the present specification. The results are also shown in Table I.

Further, for reference, the conditions and results of Example 1, shown in Table 1 in the specification of the present application, are again shown in Table I below. Example 1 employed an ethylene/α-olefin copolymer synthesized in the presence of a single site catalyst.

d=0.90 g/cm3 multi-site catalyst

single site catalyst

Table I

		Comparative example A	Example 1
a	SEPS	100	100
b	Paraffin oil	40	40
c-1	Ethylene/α-olefin copolymer (ethylene/1-octene copolymer synthesized using single site catalyst) (Density, 0.870)	none	133
	Ethylene/α-olefin copolymer (very low-density straight-chain polyethylene synthesized using multi site catalyst) (Density, 0.90)	133	none
d-1	Block polypropylene	33	33
e	Organic peroxide	0.66	0.66
f	Crosslinking aid	2	2
	Maleic acid-modified LLDPE	27	27
B-1	Kisma 5LH	500	500
	Antioxidant	3	3
	Lubricant	6	6
Properties of the sheet	Extension (%)	210	200
	Tensile strength (MPa)	15	19
	Heat deformation at 121 °C (%)	13	13
Characteristics of the electric wire	Extension (%)	220	220
	Tensile strength (MPa)	16	20
	Horizontal flame test	10/10	10/10
	60°-inclined flame test	10/10	10/10
	Abrasion resistance	O	O
	Whitening	×	O
	Heat deformation (%)	19	21
	Extrudability	×	O
	Flexibility	×	O

Note: Evaluations (acceptable levels)

For sheets:

Extension, 100% or more; Tensile strength, 10 MPa or more; Heat deformation, 30% or less

For insulated wires:

Extension, 100% or more, Tensile strength, 10 MPa or more; Abrasion resistance, the number of movements of the blade until it contacts the conductor was 1000 or more (rated "O") or 500 or more but less than 1000 (rated "Δ"); Whitening, no whitening was observed after winding 6 times (rated "O") or was observed 1 to 5 times (rated "Δ"); Heat deformation, less than 50%; Extrudability, extrusion was possible with a normal load and with good outer appearance (rated "O") or with a little large load and a slightly poor outer appearance (rated "Δ"); Flexibility, the length of the end lowered from the original level was 3 cm or more (rated "O") or 1 cm or more but less than 3 cm (rated "Δ").

In the results of the horizontal flame test, the number of samples that passed the test (per 10 trials) were shown; and in the results of the 60°-inclined flame test, number of samples that passed the test (per 10 trials) were shown.

As is apparent from the results shown in Table I, the sheet and the insulated wire prepared employing the ethylene/α-olefin copolymer synthesized in the presence of a single site catalyst (Example 1) exhibited unexpectedly superior results in some of the evaluation items, compared with those prepared employing the ethylene/α-olefin copolymer synthesized in the presence of a multi site catalyst (Comparative example A).

Specifically, the wire prepared employing the resin composition of Comparative example A was remarkably inferior in whitening, extrudability, and flexibility (rated "×") compared with one prepared employing the resin composition of Example 1 (rated "○").

Accordingly, it should be apparent that a fire-retardant resin composition according to the present invention, which employs an ethylene/α-olefin copolymer synthesized using a single site catalyst, is excellent in mechanical characteristics including whitening, extrudability, and flexibility, as well as heat resistance.

The data already of record in the specification and the supplemental data submitted herewith demonstrate unexpectedly superior results of the claimed method for processing fire-retardant resin composition over those of the cited prior art.

4. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: December 26, 2001

Kazuhiko Kobayashi
Kazuhiko KOBAYASHI

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Receipt is hereby acknowledged of the papers filed as indicated in connection with the above identified case.
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